

What is Claimed is:

1. An electric power steering apparatus,
comprising:

an electric motor for producing a steering
5 assist force; and

a speed reduction mechanism for decelerating
the rotation of an output shaft in the electric
motor,

the speed reduction mechanism comprising an
10 input pulley driven by the electric motor, an
output pulley connected to a steering shaft, and
a belt for connecting the input pulley and the
output pulley to each other, wherein

the belt includes a helical toothed belt, and
15 the input pulley and the output pulley
respectively include helical toothed pulleys
meshed with the helical toothed belt.

2. The electric power steering apparatus
according to claim 1, wherein

20 the helical toothed belt comprises teeth, and
an angle formed between a tooth trace of each of
the teeth of the helical toothed belt and a width
direction of the helical toothed belt is set to
not more than 10 degrees.

25 3. The electric power steering apparatus

according to claim 1, wherein

the helical toothed belt comprises teeth, and
an angle formed between a tooth trace of each of
the teeth of the helical toothed belt and a width
5 direction of the helical toothed belt is set in
a range of 5 degrees to 10 degrees.

4. The electric power steering apparatus
according to claim 1, wherein

each of the helical toothed pulleys comprises
10 teeth, and an angle of torsion of a tooth trace
of each of the teeth of each of the helical toothed
pulleys is set to not more than 10 degrees.

5. The electric power steering apparatus
according to claim 1, wherein

15 each of the helical toothed pulleys comprises
teeth, and an angle of torsion of a tooth trace
of each of the teeth of each of the helical toothed
pulleys is set in a range of 5 degrees to 10
degrees.

20 6. The electric power steering apparatus
according to claim 1, wherein

the output pulley has an annular shape
surrounding the steering shaft.

7. The electric power steering apparatus
25 according to claim 1, wherein

the steering shaft includes a rack shaft extending along a width direction of a vehicle.

8. The electric power steering apparatus according to claim 7, further comprising

5 a conversion mechanism for converting a rotation of the output pulley into an axial movement of the rack shaft.

9. The electric power steering apparatus according to claim 8, wherein

10 the conversion mechanism includes a ball screw mechanism, and

the ball screw mechanism comprises a ball nut surrounding the rack shaft and rotatable integrally with the output pulley, a screw groove
15 formed on a peripheral surface of the rack shaft, and a ball interposed between the screw groove and the ball nut.

10. The electric power steering apparatus according to claim 1, further comprising

20 a first shaft connected to a steering wheel so as to be integrally rotatable,

the steering shaft including a second shaft connected to the first shaft through a torsion bar so as to be relatively rotatable.

25 11. The electric power steering apparatus

according to claim 1, further comprising

a first shaft connected to a steering wheel
so as to be integrally rotatable, a second shaft
connected to the first shaft through a torsion bar
5 so as to be relatively rotatable, and a rack shaft
extending along a width direction of a vehicle,
the steering shaft including a pinion shaft
meshed with the rack shaft.

12. The electric power steering apparatus
10 according to claim 1, further comprising

means for changing a distance between
respective centers of the input pulley and the
output pulley.

13. The electric power steering apparatus
15 according to claim 12, further comprising

a first housing for holding the input pulley,
and

a second housing for holding the steering
shaft,

20 the first and the second housings comprising
opposite sections opposed to each other, and

the means for changing the distance between
the centers including a spacer, interposed between
the opposite sections of the first and the second
25 housings, for adjusting a spacing between the

opposite sections.

14. The electric power steering apparatus according to claim 1, wherein

the speed reduction mechanism includes a pair
5 of belt pulley mechanisms, and

each of the belt pulley mechanisms is provided with the helical toothed pulley serving as the input pulley, the helical toothed pulley serving as the output pulley, and the helical toothed belt.

10 15. The electric power steering apparatus according to claim 14, wherein

respective tooth traces of teeth of the helical toothed belts in the pair of belt pulley mechanisms are inclined in a same direction.

15 16. The electric power steering apparatus according to claim 14, wherein

respective tooth traces of teeth of the helical toothed belts in the pair of belt pulley mechanisms are inclined in opposite directions.